

PATENT SPECIFICATION (11)

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(54) IMPROVEMENTS IN OR RELATING TO SEATS

(71) We, PULLMAN FLEXOLATORS LIMITED, a British Company, of Excel House, 42 Upper Berkeley Street, London W1H 7PL, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to seats, and has particular relevance to vehicle seats.

It is well known that lumbar support is beneficial to the user of a vehicle seat, and various forms of lumbar support devices have been proposed. An object of the present invention is the provision of adjustable lumbar support in a vehicle seat.

According to the present invention there is provided a seat backrest, comprising a supporting frame, a generally flat platform element suspended transversely across said supporting frame by means of two rows of suspension elements linked between lateral margins of the platform element and anchorages provided on or connected to said supporting frame, in order to provide a back support, and an adjusting member arranged for movement of lateral margins of the said platform element in the lumbar region of the support in a direction generally at right angles to the plane of the platform element in order to vary the attitude of the platform element in use.

Suitably, said platform element comprises a lattice member of the kind marketed under the Registered Trade Mark PULLMAFLEX, comprising a series of parallel cord lengths and a series of cross-wires.

Preferably, said platform element is suspended across the frame by means of two rows of horizontal tension springs.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings in which:—

Figure 1 is a diagrammatic front elevation showing one form of seat backrest according to the invention;

Figure 2 is an enlarged detail view of the lumbar-region part of the backrest shown in Figure 1;

Figures 3, 4 and 5 are sections taken on the line X—X of Figure 2 and illustrating alternative configurations of the lumbar-region part of the backrest;

Figure 6 is a front elevation of another form of seat backrest according to the invention;

Figures 7 and 8 are detail views in the direction of arrow VII in Figure 6 and illustrating alternative configurations of the lumbar-region part of the backrest;

Figure 9 is a front elevation of a further form of seat backrest according to the invention;

Figures 10 and 11 are sections taken on the line Y—Y of Figure 9 and illustrating alternative positions of the lumbar-region part of the backrest;

Figure 12 is a detail view showing a lever part of the backrest shown in Figures 9 to 11; and,

Figures 13 and 14 are front and side views of yet a further form of seat backrest according to the invention.

Referring to Figures 1 to 5 of the drawings, Figure 1 shows back frame 10 of a vehicle seat, the seat frame not being illustrated as it is not relevant to the present invention. The frame 10 in this case, comprises a dished metal pressing having a strengthened rim 11, and upright side ribs 12 are welded to the pressing. A PULLMAFLEX pad provides a platform element 13, comprising a series of paper cords 14 of which the outermost cords are wire-cored and cross wires 15 which are locked around the cords 14, is suspended across the frame by two rows of short helical tensions springs 16. The springs 16 are formed with hooked inner ends which hook round the cords 14 and hooked outer ends which are anchored on the side ribs 12.

It will be noted that a lower part of the element 13, which is indicated at 17 and which corresponds in position to the lumbar region of an average user of the seat, is supported by a pair of longer springs 16A which hook round the cords 14 and are carried at their outer ends on adjustable means 18 according to the present invention.

The adjustable means are shown in more detail in Figure 2 and comprise a pair of lever arms 19 which are formed with apertured end lugs 20 and which extend from
 5 bosses 21 secured to and near the ends of a shaped rod 22. The rod 22 is journaled in the frame rim 11, and a control knob 23 is provided for manually turning the rod 22. The knob 23 is spring-loaded inwardly
 10 and carries a peg 24 which may be moved between three locating openings 25 formed in a plate 26 which is secured to the frame 10.

As in conventional seats, the element 13 is cushioned by, for example, foam-plastic or latex and covered by trim.

In use of the seat back described above, the user may turn the knob 23 to any of its three positions so that the lever arms 19 pivot to shift the springs 16A, and thus the
 20 associated part 17 of the platform element, forwards and backwards to any of the positions shown in Figures 3 to 5 to vary the attitude of the platform element and so provide
 25 adjustable lumbar support for the user of the seat.

It will be appreciated that Figure 3 shows the position of minimum lumbar support, whereas Figures 4 and 5 show the positions
 30 of intermediate and maximum support, respectively. In all these positions, the tension in the springs 16A remains constant, but provision may be made for increasing or decreasing the spring tension, as desired.

The rod 22 is bowed at its mid region to avoid engagement with the element 13, particularly in the positions illustrated in Figures
 35 2 and 3, and, in the present embodiment where the seat frame comprises a dished pressing, there is adequate space to accommodate rearward movement of the bowed part of the rod.

Referring now to Figures 6 to 8 of the drawings, the vehicle seat has a tubular
 45 metal backrest frame 60, and the platform element 13 is again suspended across a major part of the frame by four pairs of tension springs 16. The upper two pairs of springs 16 are anchored on the frame 60
 50 and the lower two pairs are anchored on lever arms 61 and 62 of a shaped rod 63 which is pivotally mounted in bearings 64 secured to the frame 60. The arm 61 is formed with an extension 65 which is provided with a knob, for manual operation. A
 55 tension-spring 66 which is anchored at its lower end on a bracket 67 secured to the frame 60, urges the extension downwardly into engagement with one of three recesses
 60 68, 69, 70 in the bracket.

In use of the seat back of Figures 6 to 8, the lever arm 61 can be flexed to disengage from one recess and then pivoted forwardly or rearwardly to enter another recess. Figure
 65 7 shows the forward position, in recess 68,

which carries the two lower springs into the position of maximum lumbar support, whereas Figure 8 shows the position of minimum support with the arm engaged in recess
 70 70.

Turning now to Figures 9 to 12, platform element 80 is of reduced height and extends across dished metal frame 81 only at the area corresponding to the position of the
 75 lumbar region of the user of the seat. The remaining area is upholstered by conventional material. In this embodiment, the platform element is supported by upper and lower tension springs 82 and 83. The springs
 80 are anchored on a wire-rod sub-frame 84 which is pivotally mounted at 85 on the dished frame 81. A lever arm 86 is pivotally mounted at 87 on the frame 81, and is formed with a cam-like part 88 which engages lower lengths 89 of the sub-frame 84,
 85 and with a handle 90.

In use of the seat back of Figures 9 to 12, the sub-frame 84 is urged rearwardly by the seat upholstery but can be moved from the position shown in Figure 10 by upward pivotal
 90 movement of the lever arm 86. This lever movement swings the sub-frame forwardly to the position shown in Figure 11 where increased lumbar support is provided. In this forward position the lower length 89 engages
 95 as a detent in recess 91 in part 88 of the lever.

Figures 13 and 14 show a construction which is similar to that of Figures 1 to 5, but in which all the tension springs 116
 100 extend between platform element 113 and side lengths 111 of tubular seat frame 110 or brackets therein. Shaped rod 122 is pivotally mounted at its ends on the frame lengths 111, and can be returned by a control knob
 105 123 operating through step-up pinions 124 and 125. The rod 122 is formed with a central bowed part 126 which extends rearwardly to clear the element 113, and with a pair of short transverse lengths 127 which
 110 swing forwardly to engage the outermost cords 114 of the element 113. Split nylon sleeves 128 are fitted over the side cords 114 of the platform element, to minimise interference between the rod lengths 127
 115 and the locked-over ends of cross wires 115. The sleeves also minimise friction and allow the cords to slide inwardly towards one another as the rod moves the element 113 rearwardly.
 120

The knob 123 may be provided with a friction brake, or means may be provided to lock the knob in alternative positions. As illustrated, there is a simple relatively low-ratio drive between the pinions 124 and 125, 125
 but irreversible gearing may be provided to produce a locking effect.

Further modifications may be made, and the invention may be applied to other types of vehicle or furniture seat frame. In some 130

cases it may be necessary to employ alternative adjustable means, such as separate side knobs, or a cable arrangement, or possibly piston-and-cylinder devices, and the lumbar-region part of the pad can be shifted manually or, for example, electrically.

As described above, the platform element (13, 80, 113) is a paper-cord and wire lattice, but alternative flat members in the form of, for example, rubber diaphragms, shaped spring wires, or fabric-based members may be employed. In cases where the flat member itself is resilient, as in a rubber diaphragm, the side springs may be replaced by links.

WHAT WE CLAIM IS:—

1. A seat backrest, comprising a supporting frame, a generally flat platform element suspended transversely across said supporting frame by means of two rows of suspension elements linked between lateral margins of the platform element and anchorages provided on or connected to said supporting frame, in order to provide a back support, and an adjusting member arranged for movement of lateral margins of the said platform element in the lumbar region of the support in a direction generally at right angles to the plane of the platform element in order to vary the attitude of the platform element in use.

2. A seat backrest as claimed in Claim 1, in which said platform element is in the form of a lattice member comprising a series of parallel cord lengths and a series of cross-wires, and said suspension elements are resiliently extensible.

3. A seat backrest as claimed in Claim 1, in which said platform element comprises a rubber diaphragm or a fabric-based member, or is formed from shaped spring wires.

4. A seat backrest as claimed in any preceding Claim, in which said suspension elements comprise generally horizontal tension springs.

5. A seat backrest as claimed in any preceding Claim, in which said adjusting member is arranged to move anchorages for said suspension elements relatively to the supporting frame in a direction generally at right angles to the plane of the platform element and thus to carry in the same direction the said suspension elements and the margins of the platform element connected thereto.

6. A seat backrest as claimed in Claim 5, in which said adjusting member comprises two turnable lever arms which are mounted

one at each side of the frame and on which said suspension members are anchored.

7. A seat backrest as claimed in Claim 6, in which said adjusting member includes an intermediate portion interconnecting said lever arms, and a manually-operable member mounted at one end of said adjusting member to enable turning of said adjusting member relatively to the said supporting frame.

8. A seat backrest as claimed in Claim 2 or Claim 4 as appended thereto, in which said adjusting member comprises a shaped rod pivotally mounted across the said supporting frame and having transverse lengths arranged to swing forwardly to engage the outermost of said cord lengths and so move the lumbar region part of the lattice member.

9. A seat backrest as claimed in Claim 8, in which a manually operable member is geared to said rod to turn the rod.

10. A seat backrest as claimed in any one of Claims 1—5, in which said platform element is mounted on a sub-frame connected to said supporting frame and providing the said anchorages for said suspension elements, the said platform element extending across the supporting frame only at said lumbar region of the user, and said sub-frame being movable by said adjusting member.

11. A seat backrest as claimed in any preceding Claim, in which cooperating recess and detent means are provided to hold the lumbar region part of the generally flat member in one or more selected positions.

12. A seat backrest as claimed in any of Claims 1 to 10, in which braking means are provided to hold the lumbar region part of said platform element in a chosen position.

13. A seat backrest, substantially as hereinbefore described with reference to Figures 1 to 5, Figures 6 to 8, Figures 9 to 12, or Figures 13 and 14 of the accompanying drawings.

14. A vehicle seat incorporating a backrest as claimed in any preceding Claim.

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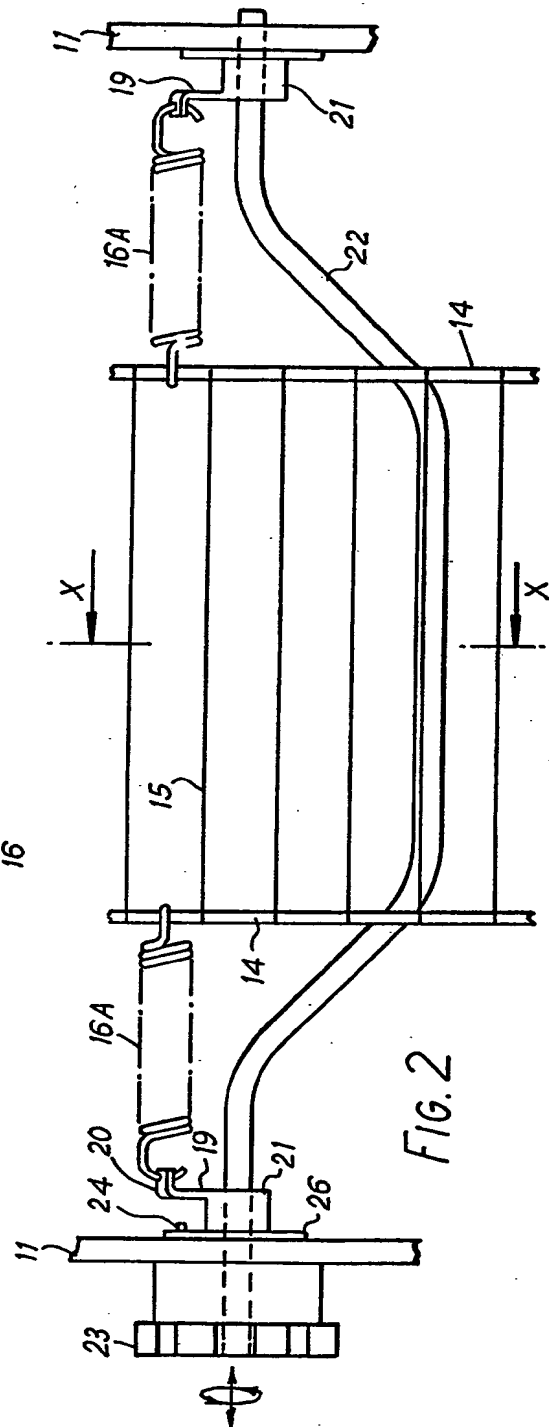
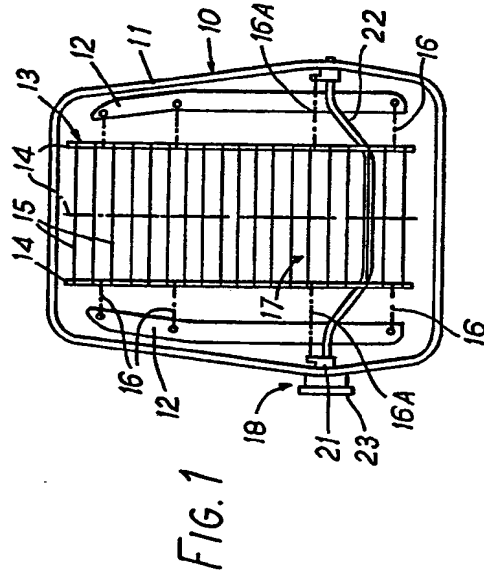
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 the Original on a reduced scale.
 SHEET 1

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SHEET 1



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SHEET 2

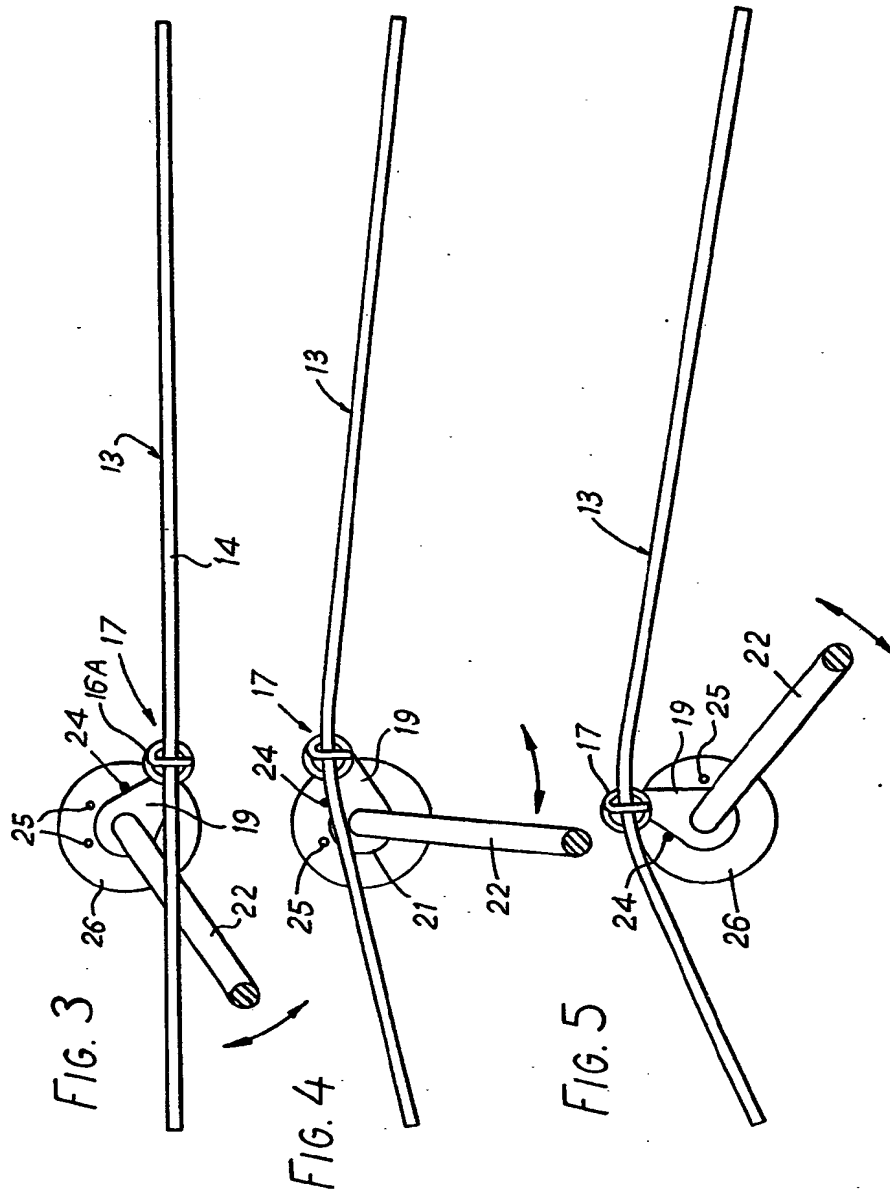


FIG. 6

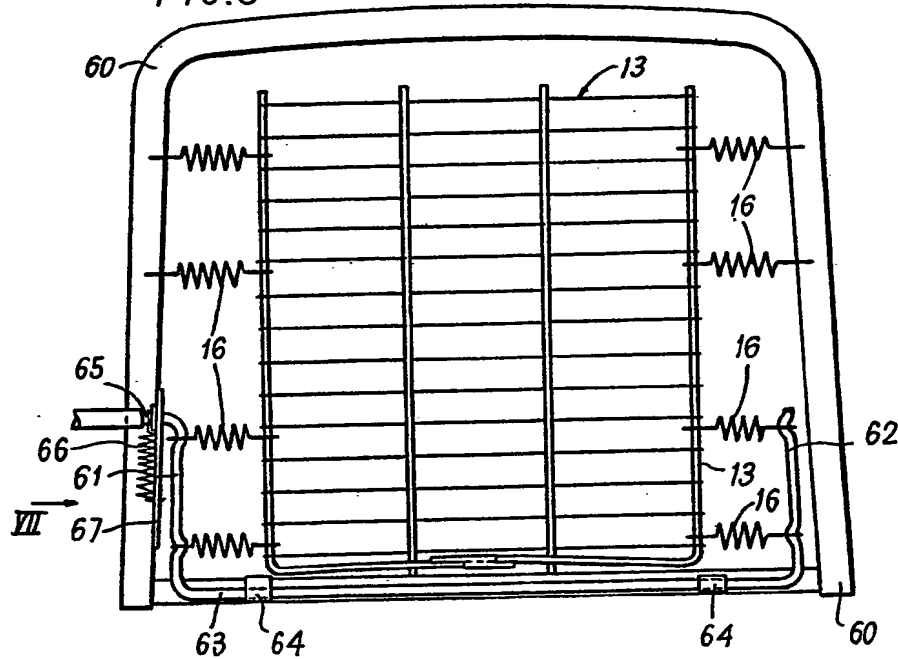


FIG. 7

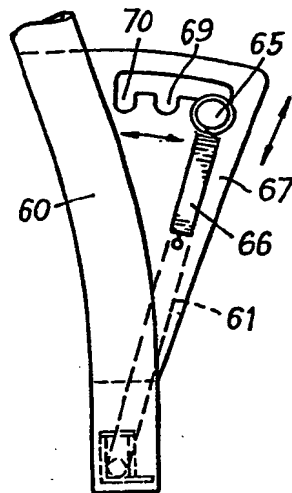


FIG. 8

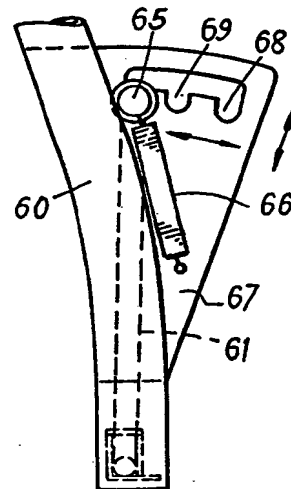


FIG. 9

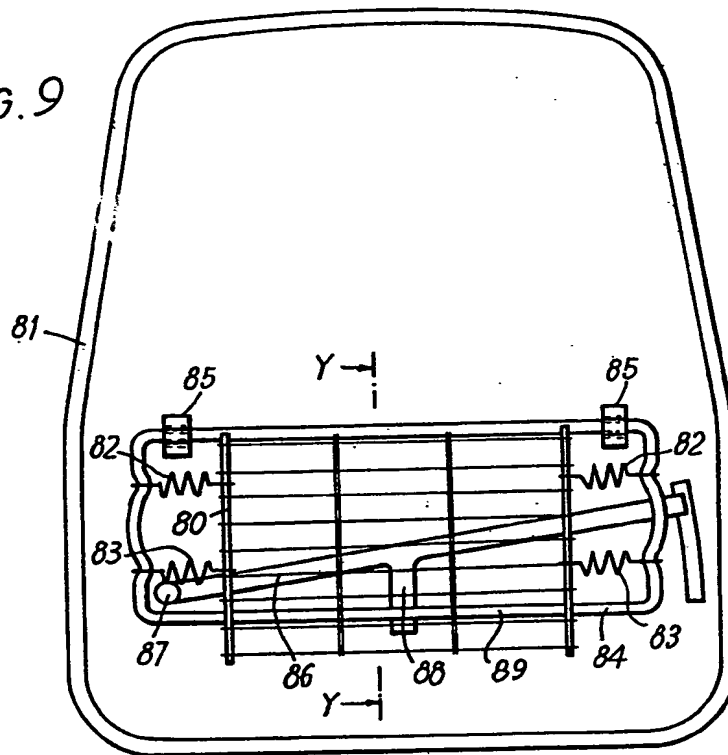


FIG. 10

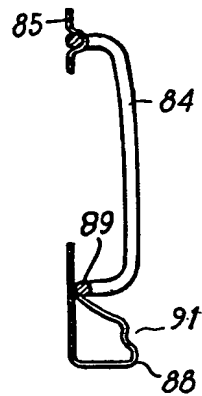


FIG. 11

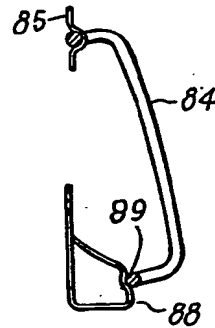


FIG. 12

